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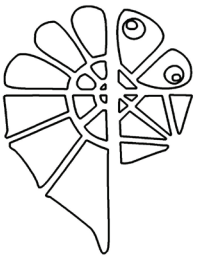

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SECOND CONTRIBUTION TO KNOWLEDGE OF THE GALL MIDGES (DIPTERA: CECIDOMYIIDAE) OF SERBIA

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The present paper cites 19 gall midges species (Diptera: Cecidomyiidae), 17 of which are new to the fauna of Serbia. Of these, five are new to the fauna of the Balkan Peninsula and four are recorded for the first time for the republics of former Yugoslavia. *Contarinia lini* Simova & Skuhravá, the description of which was published in 2007, is a new species to science whose *terra typica* is Novi Beograd. Recorded in Serbia for the first time in 2007, *Obolodiplosis robiniae* (Haldeman, 1847) is an invasive species introduced from North America.

Key words: Diptera, Cecidomyiidae, fauna, gall midges, new records

INTRODUCTION

Investigations of gall midges conducted to date on the territory of Serbia have established the presence of 283 species, and 24 more species of as yet undescribed galls with gall midge larvae that probably represent species new to science have also been found. Of the number of species mentioned, 11 are pests of cultivated plants and about 30 are

potential pests of agricultural and forest crops, while four species belong to the group of beneficial insects and that can be used in biological control of other pests and weeds (Simova-Tošić *et al*. 2000).

MATERIAL AND METHODS

The species presented in this paper were collected during the period of 2003-2007, predominantly in the wider area of Belgrade. The plants with galls were herbarized and are stored in the collection "Herbarium cecidologicum Duške Simove" in the Natural History Museum in Belgrade. Larvae and adults were fixed in 70% alcohol containing several drops of glycerin. The keys for identification of Buhr (1964-1965), Houard (1908-1909), and Skuhravá & Skuhravý (1960) were used for determination of midge galls. The nomenclature of gall midge species is according to Skuhravá (1986; 1989) and Gagné (2004).

LIST OF SPECIES OF GALL MIDGES

The following data are given for each species: host plant species and its family; gall type; appearance of larvae; locality and time of finding; and distribution.

Asphondylia ervi Rübsaamen, 1896

Host: *Vicia villosa* Roth. (Fabaceae).

The intensely yellow solitary larvae live in partially swollen and deformed pods (Fig. 1).

The interior of the gall is lined with a dense network of mycelium.

Locality: Belgrade (Resnik), 24 July 2004, leg. A. Stojanović.

Distribution: Widely distributed on *Vicia hirsuta* (L.) S. F. Gray in Europe and Japan (Gagné 2004). New to the faunas of Serbia and for all Yugoslav territory (Skuhravá 1986).

Asphondylia lathyri Rübsaamen, 1914

Host: *Lathyrus pratensis* L. (Fabaceae).

The orangish-yellow solitary larvae (and later the pupae as well) live in irregularly swollen pods whose interior contains fungal mycelium (Fig. 2).

Locality: Mala Moštanica (Žuta Brdo), 07 August 2004 and 27 August 2005, leg. A. Stojanović.

Distribution: According to the data of Skuhravá (1986) and Gagné (2004), this species was up to now recorded in Great Britain, Germany, Poland, Czechoslovakia, Hungary, and Russia (Western Siberia). New to the fauna of Serbia and not cited before for the other republics of former Yugoslavia.

Contarinia barbichei (Kieffer, 1890)

Host: *Lotus uliginosus* Schkuhr (Fabaceae).

The whitish-yellow larvae develop in terminal spindle-shaped galls (Fig. 3).

Locality: Belgrade (Veliki Mokri Lug, Stepin Gaj), 26 June 2004, leg. A. Stojanović.

Distribution: Widely distributed in Europe with *Lotus corniculatus* L. cited as the host. On the territory of former Yugoslavia, it has been recorded in Slovenia (Simova-Tošić *et al*. 1996) and Croatia (Simova-Tošić *et al*. 2004). New to the fauna of Serbia.

Contarinia cotini Kieffer, 1901

Host: *Cotinus coggygria* Scop. (Anacardiaceae).

The pale-yellow larvae live in galls of flower buds that are slightly enlarged and do not open (Fig. 4).

Locality: Deliblato Sands (Devojački Bunar), 28 May 2005 and 12 May 2007, leg. A. Stojanović.

Distribution: A sub-Mediterranean species previously recorded in Czechoslovakia, Hungary, Romania, and Ukraine (Skuhravá 1986). Also found in Slovenia (Janežič 1978) and reported in Croatia by Baudyš (1928). New to the fauna of Serbia.

Contarinia lini Simova & Skuhravá, 2007

Host: *Linum austriacum* L. (Linaceae).

Numerous pale-yellow larvae of this species live in slightly swollen flower buds that do not open (Fig. 5).

Locality (new finds): Belgrade (Bežanijska Kosa), 13 June 2006, leg. D. Smiljanić.

Distribution: Serbia (*terra typica* - Novi Beograd).

Contarinia variabilis Rübsaamen, 1917

Host: *Rumex crispus* L. (Polygonaceae).

Individual whitish larvae are found between two fruit covers without causing visible outward deformations (Fig. 6).

Locality: Belgrade (Veliki Mokri Lug, Stepin Gaj), 26 June 2004, leg. A. Stojanović.

Distribution: According to Skuhravá (1986) and Gagné (2004), this species has up to now been found only in Germany, on *Rumex scutatus* L. New to the fauna of Serbia and Southern Europe.

Contarinia viburnorum Kieffer, 1913

Host: *Viburnum lantana* L. (Caprifoliaceae).

Numerous (as many as 18) yellowish larvae of this species live in slightly enlarged flower buds that do not open (Fig. 7).

Localities: Belgrade (Košutnjak), 01 May 2006, leg. A. Stojanović; Srem (Surduk), 06 May 2006, leg. A. Stojanović.

Distribution: Recorded in a number of European countries (Skuhravá 1986). Of countries on the territory of former Yugoslavia, it has been cited only for Slovenia (Simova-Tošić *et al*. 1996). New to the fauna of Serbia.

Cystiphora sanguinea (Bremi, 1847)

Host: *Hieracium praealtum* Will. et Gochant (Asteraceae) (Fig. 8). The host was determined by M. Niketić.

Figs 1 – 10. - Gall midges galls on different host plants: 1. galls of *Asphondylia ervi* on pods of *Vicia villosa*, 2. galls of *Asphondylia lathyri* on pods of *Lathyrus pratensis*, 3. galls of *Contarinia barbichei* on *Lotus uliginosus*, 4. galls of *Contarinia cotini* on *Cotinus coggygria*, 5. galls of *Contarinia lini* on *Linum austriacum*, 6. galls of *Contarinia variabilis* on *Rumex crispus*, 7. galls of *Contarinia viburnorum* on *Viburnum lantana*, 8. galls of *Cystiphora sanguinea* on *Hieracium praealtum*, 9. galls of *Dasineura armoraciae* on *Armoracia rusticana*, 10. galls of *Dasineura auritae* on *Salix cinerea*. Photos A. Stojanović.

The whitish-yellow larvae cause pustule galls on leaves of the host.

Locality: Belgrade (Resnik), 31 May 2003, leg. A. Stojanović.

Distribution: Widely distributed in Europe. New to the fauna of Serbia.

Dasineura armoraciae (Vimmer, 1936)

Host: *Armoracia rusticana* G. M. Sch. (Brassicaceae).

The gregarious larvae of this species live in slightly enlarged flower buds that do not open (Fig. 9).

Locality: Belgrade (Grocka, Begaljica), 20 May 2006, leg. A. Stojanović.

Distribution: Germany, Poland, Czechoslovakia, Romania (Skuhravá 1986; Gagné 2004); Slovenia (Simova-Tošić *et al*. 1996); Croatia (Simova-Tošić *et al*. 2004); Bosnia and Herzegovina (Simova-Tošić *et al*. 2007). New to the fauna of Serbia.

Dasineura auritae (Rübsaamen, 1915)

Host: *Salix cinerea* L. (Salicaceae).

Galls developing on leaves cause marginal rolls toward the underside of the leaf. The gall is narrow, its walls slightly thickened and lighter-colored (Fig. 10). The larvae are yellow.

Locality: Podlužje (Boljevci, Crni Lug), 30 July 2005, leg. A. Stojanović.

Distribution: Widely distributed in Europe. Recorded in Slovenia, Croatia, and Bosnia and Herzegovina (Simova-Tošić *et al*. 1996; 2004; 2007). New to the fauna of Serbia.

Dasineura oxyacanthae (Rübsaamen, 1914)

Host: *Crataegus oxyacantha* L. (Rosaceae).

The numerous orangish larvae develop in flower buds that do not open. All parts of the flower are developed, but the bases of the bud and ovary are somewhat thickened and slightly deformed (Fig. 11).

Locality: Belgrade (Košutnjak), 01 May 2006, leg. A. Stojanović.

Distribution: Widely distributed in Europe (Skuhravá 1986; Gagné 2004). Of the Balkan countries, cited only for Slovenia (Simova-Tošić *et al*. 1996). New to the fauna of Serbia.

Dasineura similis (F. Löw, 1888)

Host: *Veronica anagallis-aquatica* L. (Scrophulariaceae).

The orangish-yellow larvae develop in spindle-shaped galls on terminal leaf buds, in thickened and expanded leaf extensions embracing the flower cluster, and in attacked flower buds with thickened sepals (Fig. 12). The pupa is formed in the gall.

Locality: Mala Moštanica (Žuto Brdo), 13 May 2006, leg. A. Stojanović.

Distribution: A widely distributed European species (Skuhravá 1986; Gagné 2004). Not previously cited for the Balkan countries. New to the fauna of Serbia.

Geocrypta braueri (Handlirsch, 1884)

Host: *Hypericum perforatum* L. (Hyperaceae).

Ranging in color from white to pale-apricot, the solitary larvae live in buds on the root collar that are transformed into onion-shaped galls (Fig. 13). The pupa is formed in the gall.

Localities: (Srem and Stari Slankamen), 17 June 2006, leg. A. Stojanović; Belgrade (Košutnjak), 24 June 2006, leg. A. Stojanović.

Distribution: Widely distributed in Europe (Skuhravá 1986; Gagné 2004). New to the faunas of Serbia and all the republics of former Yugoslavia.

Macrolabis lonicerae Rübsaamen, 1912

Host: *Lonicera caprifolium* L. (Caprifoliaceae).

Galls are found on the tips of shoots in the form of a rosette with upwardly rolled leaf margins, where a large number of whitish larvae are found (Fig. 14).

Locality: Mala Moštanica (Žuto Brdo), 13 May 2006, leg. A. Stojanović.

Distribution: Recorded up to now in Great Britain, The Netherlands, Germany, Poland, and Czechoslovakia (Skuhravá 1986; Gagné 2004). New to the faunas of Serbia and all the republics of former Yugoslavia.

Macrolabis hieracii (Rübsaamen, 1917)

Host: *Hieracium umbellatum* L. (Asteraceae). The plant was determined by M. Niketić.

The numerous white larvae live under the outer leaves of terminal galls (Fig. 15).

Locality: Deliblato Sands (Devojački Bunar), 07 June 2003, leg. A. Stojanović.

Distribution: Widely distributed in Europe (Skuhravá 1986; Gagné 2004). New to the fauna of Serbia. Of the republics of former Yugoslavia, recorded only in Slovenia (Simova-Tošić *et al*. 1996).

Obolodiplosis robiniae (Haldeman, 1847)

Host: *Robinia pseudoacacia* L. (Fabaceae).

The milky-white larvae cause downward rolling of the leaf margin (toward the underside of the leaf). The rolled part of the leaf is thickened and displays a pale-green to yellowish color that with age becomes almost brown (Fig. 16). Several galls can be present on a single leaf. The larvae are gregarious and at the outset glassily transparent and very motile. Mature larvae are white and form pupae in the gall or in the ground. Galls are encountered throughout most of the vegetation of black locust.

Locality: Found at a number of locations in Belgrade, Novi Beograd and Zemun in 2007.

Distribution: This is a North American species that first emigrated to Korea and Japan (Gagné 2004) and then to Europe as well. According to the data of Skuhravá *et al*. (2007), its presence has been established to date in the following European countries: Italy, Great Britain, Greece, the Czech Republic, Croatia, Slovakia, Germany, Hungary, Ukraine, Serbia, France, The Netherlands, Austria, Switzerland, and Poland.

Obolodiplosis robiniae is an introduced invasive species that has become widely disseminated in many European countries since 2003, when it was first recorded in Italy (Skuhravá *et al*. 2007). In Serbia, it was first reported in 2007 in Novi Beograd (Block 34, 06 May 2007, leg. A. Stojanović and later recorded at many locations in the wider area of Belgrade and Zemun.

Paradiplosis abietispectinatae (Tubeuf, 1930)

Host: *Abies alba* Mill. (Pinaceae).

Galls are in the form of roundish or spindle-shaped reddish or brown thickenings predominantly in the lower part of the needle on its inner or outer side (Fig. 17). There can be several galls in a row on a single needle, which leads to needle shedding and retards the growth of young fir trees in cases of more severe attack. One or (more rarely) two orangish-yellow larvae are present inside each gall.

Locality: Mt. Goč, 06 May 2003, leg. D. Smiljanić; and Mt. Goč, 13 June 2003, leg. Č. Marković.

Distribution: France, Germany, Czechoslovakia, and Romania (Skuhravá 1986; Gagné 2004). New to the faunas of Serbia and the republics of former Yugoslavia.

Placochela ligustri (Rübsaamen, 1899)

Host: *Ligustrum vulgare* L. (Oleaceae).

Flower buds are enlarged, somewhat thickened, almost normal in color, and do not open. The yellow larvae live in the interior of the flower bud (Fig. 18).

Localities: Mt. Kosmaj, 18 June 2005, leg. A. Stojanović; Belgrade (Veliko Selo), 09 June 2007, leg. A. Stojanović.

Distribution: Great Britain, The Netherlands, France, Germany, Czechoslovakia, Italy, Austria, Hungary, and Romania (Skuhravá 1986; Gagné 2004); Slovenia (Simova-Tošić *et al*. 1996); and Bosnia and Herzegovina (Simova-Tošić *et al*. 2007). New to the fauna of Serbia.

Rhopalomyia baudysi Vimmer, 1928

Host: *Artemisia pontica* L. (Asteraceae).

The larvae cause ovoid galls of terminal buds, but they are difficultly discernible. Expressed symptoms of their presence are shortening of the shoot and abnormal closeness of the leaflets. In the middle part of the gall lives a solitary larva that is transformed into a pupa at the site of development. In time, lateral shoots grow out below the attacked and damaged terminal bud (Fig. 19).

Locality: Belgrade (Veliko Selo), 08 July 2006, leg. A. Stojanović.

Distribution: Recorded to date only on *Artemisia pontica* in Czechoslovakia (Skuhravá 1986; Gagné 2004), which is the *terra typica* of this species. New to the gall midge faunas of Serbia and Southern Europe.

RESULTS AND CONCLUSIONS

The gall midge fauna of Serbia has been relatively well investigated, to judge from comparison with the number of species established in neighboring countries: 310 in Romania (Skuhravá *et al*. 1972); 240 in Bulgaria (Skuhravá *et al*. 1991; 1992); 332 in Hungary (Skuhravá & Skuhravý 1999); 219 in Slovenia (Skuhravá *et al*. 1996); 85 in Montenegro (Simova-Tošić *et al*. 2001); 147 in Macedonia (Simova-Tošić *et al*. 2007); 169 in Bosnia and Herzegovina (Simova-Tošić *et al*. 2007); 233 in Croatia (Simova-Tošić *et al*. 2004); and 167 in Greece (Skuhravá & Skuhravý 1997).

The paper cites 19 gall midges species (Diptera: Cecidomyiidae), 17 of which are new to the fauna of Serbia. Of these, five are new to the fauna of the Balkan Peninsula and four are recorded for the first time for the republics of former Yugoslavia. *Contarinia lini* Simova and Skuhravá, the description of which was published in 2007, is a new species to science whose *terra typica* is Novi Beograd. Recorded in Serbia for the first time in 2007, *Obolodiplosis robiniae* (Haldeman, 1847) is an invasive species introduced from North America.

With the previously established 283 species (Simova-Tošić *et al*. 2000), 19 species presented in this paper, and 24 species that have not

Figs 11 – 19. - Gall midges galls on different host plants: 11. galls of *Dasineura oxyacanthae* on *Crataegus oxyacantha*, 12. galls of *Dasineura similis* on *Veronica anagallis-aquatica*, 13. galls of *Geocrypta braueri* on *Hypericum perforatum*, 14. gall of *Macrolabis lonicerae* on *Lonicera caprifolium*, 15. gall of *Macrolabis hieracii* on *Hieracium umbellatum*, 16. galls of *Obolodiplosis robiniae* on *Robinia pseudoacacia*, 17. galls of *Paradiplosis abietispectinatae* on *Abies alba*, 18. galls of *Placochela ligustri* on *Ligustrum vulgare*, 19. exibited symptoms of *Rhopalomia baudysi* on *Artemisia pontica*. Photos A. Stojanović.

yet been described and which are probably new to science, the gall midge fauna of Serbia comprises 326 species, so it can be considered the most thoroughly studied fauna in comparison with the faunas of neighboring countries. Most of the established species belong to the complex of phytophages of the subfamily Cecidomyiinae, while zoophagous, mycophagous, and other free-living species of the family Cecomyiinae have been very little studied. In view of this fact, it is possible to expect a far greater number of gall midge species, both in Serbia and in neighboring countries. There is thus a need for young investigators to study the given very interesting and species rich family of dipterans.

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ДРУГИ ПРИЛОГ ПОЗНАВАЊУ МУВА ГАЛИЦА (DIPTERA: CECIDOMYIIDAE) СРБИЈЕ

Душка Симова-Тошић

Р Е З И М Е

У раду је наведено 19 врста мува галица (Diptera: Cecidomyiidae), од којих је 17 нових за фауну Србије, 5 за фауну мува галица Балканског полуострва а четири су први пут утврђене за бивше југословенске републике.

Врсте приказане у овом раду сакупљане су у периоду од 2003. до 2007. године претежно на ширем подручју Београда. Биљке са галама су хербаризоване и налазе се у збирци „Herbarium cecidologicum Duške Simove“ у Природњачком музеју у Београду.

За сваку врсту дати су следећи подаци: биљка хранитељка и њена фамилија, тип гале, изглед ларве, локалитет, време налаза и распрострањење.

Посебно је занимљива недавно описана врста *Contarinia lini* Simova & Skuhravá, 2007 чија је *terra typica* Нови Београд а биљка домаћин *Linum austriacum* L. (Linaceae).

Obolodiplosis robiniae (Haldeman, 1847) је инвазиона врста интродукована из Северне Америке. Она је прво емигрирала у Кореју и Јапан а потом и у Европу и до сада је утврђена у 15 европских земаља (Skuhravá *et al.* 2007). У Србији је први пут забележена у 2007. години на више локалитета у Београду.

Степен проучености фауне мува галица Србије може се оценити као релативно добар у поређењу са бројем утврђених врста у суседним земљама. Фауна мува галица са раније утврђених 283 врсте (Simova-Tošić *et al.* 2000), 19 врста приказаних у овоме раду и 24 врсте, које на основу досадашњих сазнања су вероватно нове за науку, броји 326 врста, па се може сматрати најбоље проученом у поређењу са суседним земљама.